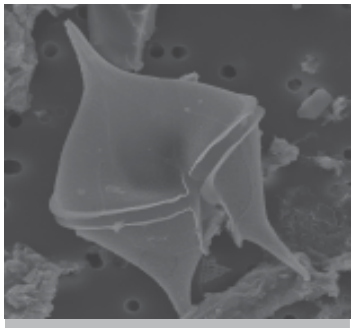
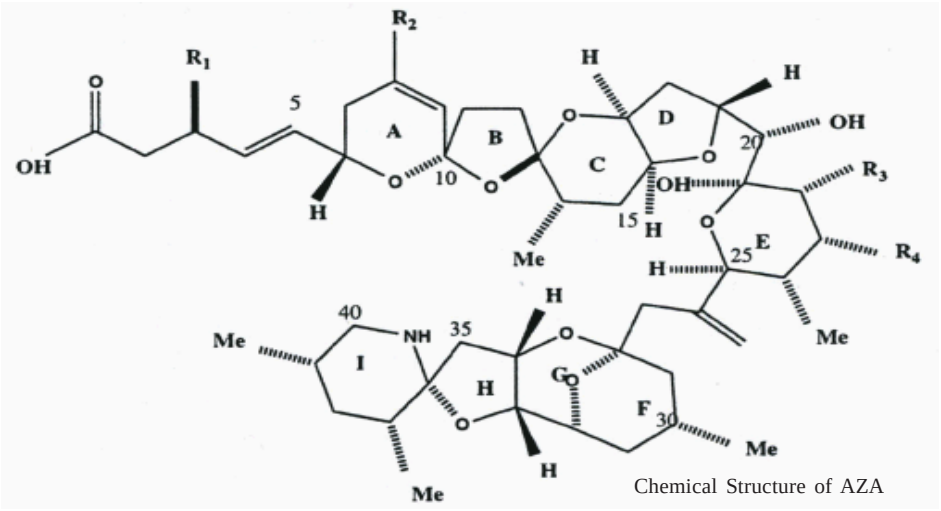


Protoperidinium spp.

Species Distribution: *Protoperidinium spp.* are dinoflagellates which can be associated with high intracellular concentrations of azaspiracid. *Protoperidinium spp.* have been observed in many coastal areas around the world.. *P. crassipes*, believed to be toxic, have been found off the coast of Ireland.

Toxins/Mode of Action:
Azaspiracid (AZA-1) and its derivatives (AZA2 to -11)

The primary toxin is a lipophilic, polyether toxin called azaspiracid (AZA-1). While the precise mode of action is still unknown, *in vivo* studies have shown effects towards the intestinal tract, lymphoid tissues, and immune system cells. An *in vitro* study has also indicated that AZA increases levels of cytosolic calcium and cAMP in lymphocytes while reducing F-actin levels in neuroblastoma cells. The precise mode of action(s) is currently being investigated.



Chemical Structure of AZA

Human Health Syndrome: Azaspiracid Poisoning (AZP)

Azaspiracid poisoning (AZP) has been confused with diarrhetic shellfish poisoning (DSP) due to the similarity of symptoms presented in humans. Like DSP, AZP causes chills, headaches, diarrhea, nausea, vomiting, and stomach cramps. However, azaspiracid is believed to be far more toxic than okadaic acid, the primary cause of DSP.

Syndrome Distribution: In 1995 the first report of AZP came from the Netherlands where blue mussels (*Mytilus edulis*) originating from Killary Harbour, Ireland induced DSP-like symptoms in humans. Ireland (1997), France (1998) and Italy (1998) all reported cases of AZP in the years that followed. The contaminated shellfish causing these illnesses were cultivated in four different regions encompassing the entire west coast of Ireland. Toxins have also been identified in mussels from England and Norway which implies a more widespread intoxication of European shellfish than was previously thought.